

Amendment to the Claims

The following listing of claims will replace all prior claim lists in this application.

Listing of Claims

1. (Currently amended) A method of fabricating a mixed substrate, wherein the method comprising:

providing two substrates each having respective faces adapted to be bonded together, the faces having crystalline portions and, wherein at least one of the faces, includes regions of a material different from the crystalline portions;

positioning the faces face-to-face and joining the faces at an interface by molecular bonding to form bulk regions, in which the faces are substantially crystalline, and stacked regions in which at least one of the faces includes regions-a region of a-the different material; and

heating to consolidate the bond,

wherein, during one of providing the first and second two substrates or joining the faces, impurity traps are created at the interface, such that any portion of the interface at a bulk region is within a predetermined distance from a trap, and wherein the misalignment between the crystalline portions when positioning the faces is less than a predetermined misalignment threshold.

2. (Previously presented) The method according to claim 1, wherein the regions of a different material comprise electrically insulative layers.

3. (Previously presented) The method according to claim 1, wherein the regions of a different material comprise localized oxide layers.

4. (Previously presented) The method according to claim 1, wherein the traps comprise localized buried layers.

5. (Previously presented) The method according to claim 1, wherein the traps are localized oxide layers.

6. (Previously presented) The method according to claim 1, wherein the regions of a different material have a thickness of approximately 0.01 microns to approximately 3 microns.

7. (Previously presented) The method according to claim 1, wherein the regions of a different material comprise localized oxide layers prepared thermal oxidation using a mask.

8. (Previously presented) The method according to claim 1, wherein the regions of a different material comprise localized oxide layers prepared by deposition using a mask.

9. (Previously presented) The method according to claim 1, wherein providing two substrates further includes a step of treating the faces to render them hydrophobic.

10. (Previously presented) A method according to claim 1, wherein the predetermined misalignment threshold is $\pm 6^\circ$ in rotation and $\pm 1^\circ$ in bending.

11. (Currently amended) The method according to claim 1, wherein the method further comprises:

etching one of the faces using a mask with patterned pattern features that are laterally spaced apart by a distance of no more ~~not farther apart~~ than the predetermined distance;

generating an oxide layer (11, 14) on the one face;

planarizing the one face to expose the non-etched regions; and

cleaning the one face to render it hydrophobic.

12. (Currently amended) The method according to claim 1, wherein preparation providing two substrates includes a step of treating the faces to render them hydrophilic.

13. (Currently amended) The method according to claim 1, wherein the given predetermined misalignment threshold is $\pm 1^\circ$ in rotation and in bending.

14. (Currently amended) The method according to claim 1, wherein the method further comprises forming an oxide layer on one of the faces and etching the oxide layer and the one face using a mask with patterns-pattern features that are laterally spaced apart by a distance of no more than ~~farther apart than~~ the predetermined distance, and forming a thermal oxide layer (21, 61) on the one face, and planarizing the one face to expose non-etched regions of the one face, and cleaning the one face to render it hydrophilic.

15. (Currently amended) The method according to claim 1, wherein providing two substrates having crystalline portions comprises providing a material selected from the group comprising one or more of Si, InP, AsGa, Ge, compounds of silicon, silicon-germanium, LiNbO₃, III-V compounds, SiC, diamond, sapphire, piezoelectric materials, and/or pyroelectric materials.

16. (Previously presented) The method according to claim 1, wherein providing two substrates having crystalline portions comprises providing silicon.

17. (Previously presented) The method according to claim 1, wherein heating to consolidate the bond comprises carrying out a heat treatment up to 3 hours at a temperature from 800°C to 1400°C, and wherein the predetermined distance is about one millimeter.

18. (Previously presented) The method according to claim 1 further comprising treating the faces with HF to remove oxides from the faces prior to positioning the faces.

19. (Previously presented) The method according to claim 1 further comprising heat treating the faces prior to positioning the faces.

20. (Previously presented) The method according to claim 1 further comprising polishing the faces by chemical mechanical polishing prior to positioning the faces.

21. (Previously presented) The method according to claim 1 further comprising plasma treating the faces prior to positioning the faces.

22. (Previously presented) The method according to claim 1 further comprising chemically treating the faces prior to positioning the faces.

23. (Previously presented) The method according to claim 1 further comprising applying a thinning treatment to one of the two substrates.

24. (Previously presented) The method according to claim 1 further comprising thinning one of the substrates by a chemical mechanical abrasion treatment.

25. (Previously presented) The method according to claim 1 further comprising preparing one of the substrates so that it is demountable and, wherein the method further comprises a subsequent step comprising demounting the one substrate.

26. (Previously presented) The method according to claim 1, further comprising thinning one of the two substrates by producing a fragile layer in the one substrate and fracturing the fragile layer.

27. (Previously presented) The method according to claim 1, wherein providing substrates having crystalline portions comprises providing two substrates prepared from the same crystal.

28. (Previously presented) The method according to claim 1, wherein providing two substrates comprises preparing the substrates by producing a fragile layer in a source crystal, placing markers on either side of the fragile layer, and fracturing the fragile layer to create two free faces, and wherein positioning the faces comprises forming the interface with the stacked regions and the impurity traps by bringing the faces into contact after lining up the markers.

29. (Previously presented) The method according to claim 28, wherein producing a fragile layer comprises ion implantation.

30. (Previously presented) The method according to claim 28, wherein producing a fragile layer comprises implanting hydrogen ions.

31. (Previously presented) The method according to claim 28, wherein placing markers comprises forming the markers within the thickness of the source crystal and on either side of the fragile layer.

32. – 38. (Cancelled)